

ABSTRACT

A system and method provides automated detailed analysis of microscopic neuronal cell morphology. Accordingly, the effects of various substances on the structure and function of neurons can be evaluated based on morphology of the neurons. An algorithm is presented
5 which utilizes a geometric approach for automatically detecting and quantifying the three-dimensional structure of dendritic spines from stacks of image data acquired using microscopy. Results are presented on the measurement of dendritic spine length, volume, density, and shape classification for both static and time-lapse images of dendrites. The approaches presented here are generalizable to other aspects of neuronal morphology.

10